

**Abstract**

A corrosion-inhibiting composition for application to a metal substrate, such as aluminum or steel, and in connection with a paint, and the synthesis of the composition is disclosed. The active inhibitor constituent of the composition can be selected from the group consisting of 2,5-dimercapto-1,3,4 thiadiazole (DMTD), 2,4-dimercapto-s-triazolo-[4,3-b]-1,3,4-thiadiazole, trithiocyanuric acid (TMT), and derivatives of DMTD and TMT, including various N- or S- and N-,N-, S- and N-,S- substituted derivatives of DMTD such as 5-mercapto-3-phenyl-1,3,4-thiadiazoline-2-thione (Bismuthiol II), various S-substituted derivatives of Trithiocyanuric acid, 5,5 dithio-bis (1,3,4 thiadiazole-2(3H)-thione (DMTD)<sub>2</sub>, 5,5'-Thiobis( 1,3,4-thiadiazole-2(3H)-thione, or (DMTD)<sub>n</sub> the polymer of DMTD, dimer and polymers of TMT, dimercaptopyridine, and 2,4-dithiohydantoin, and 2,4-dimercapto-6-amino-5-triazine, salts of DMTD of the general formula: M(DMTD)<sub>n</sub>, where n = 1,2 or 3, and M is a metal cation and preferable M = Zn(II), Bi(III), Co(II), Ni(II), Cd(II), Pb(II), Ag(I), Sb(III), Cu(II), Li(I), Ca(II), Sr(II), Mg(II), La(III), Ce(III), Pr(III), Al(III) or Zr(IV) (examples: ZnDMTD, Zn(DMTD)<sub>2</sub>, Bi(DMTD)<sub>3</sub>, similar salts of TMT, as for example, ZnTMT, in a ratio of 1:1, salts of (DMTD)<sub>n</sub> of general formula M[(DMTD)<sub>n</sub>]<sub>m</sub>, where n=2 or n>2, m=1,2, or 3 and M is as above specified. Typical examples are: Zn[(DMTD)<sub>2</sub>], Zn[(DMTD)<sub>2</sub>]<sub>2</sub>, aryl or alkyl ammonium salts of DMTD or (DMTD)<sub>n</sub>, similar salts of TMT, quaternary ammonium salts of DMTD or (DMTD)<sub>n</sub>, and TMT, poly-ammonium salt of DMTD or (DMTD)<sub>n</sub> and TMT formed with polyamines; inherently conductive polyaniline doped with DMTD or (DMTD)<sub>2</sub> and TMT; inherently conductive polypyrrole and/or polythiophen doped with DMTD, (DMTD)<sub>2</sub> and/or TMT, micro or nano composites of poly DMTD/ polyaniline, poly DMTD/polypyrrole, and poly DMTD/polythiophen, similar

micro or nano composites with TMT, DMTD or salts of DMTD  
or derivatives of DMTD and of TMT, as constituents of  
various pigment grade inorganic matrixes or physical  
mixtures, DMTD or salts of DMTD or derivatives of DMTD  
5 and TMT in encapsulated forms, such as: inclusions in  
various polymer matrices, or as cyclodextrin-inclusion  
compounds or microencapsulated form. DMTD, TMT, and their  
derivatives may also be combined with phosphates,  
molybdates, borates, silicates, tungstates,  
10 phoshotungstates, phosphomolybdates, cyanamides,  
carbonates, SiO<sub>2</sub> and mixtures thereof.